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BATON ROUGE, LOUISIANA

"DRY ROT" IN BUILDINGS AND BUILDING MATERIAL

BY

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"DRY ROT" IN BUILDINGS AND BUILDING MATERIAL

By C. W. EDGERTON

The deterioration of lumber by decay, especially lumber that is used in the construction of buildings, is a matter of importance in Louisiana. During the past few years, a number of reports have come to the Experiment Station in regard to buildings rotting rapidly. The buildings affected have included dwelling houses, school houses, churches, store buildings, and one of the University buildings at Baton Rouge. In some cases, the buildings were materially weakened before the seriousness of the rot was appreciated, while in other cases the trouble was observed and checked in time. In a few cases, the repairs that were made only furnished new lumber for the rot to destroy. The deterioration is caused by fungi the growth of which is favored by high temperatures and abundant moisture, conditions that are commonly present in this state.

There are many different types of lumber deterioration but practically all of the trouble in buildings is confined to a single one. This is the type in which the rot spreads rapidly throughout a building and is not confined to those portions in contact with the ground or kept in a wet condition. This is often spoken of as *dry rot* due to the fact that the affected wood dries out rapidly after it has passed through the decay. As a matter of fact, while the decay is in progress, the wood is wet even to the point that water may drip from it. For the lack of a better term, however, the name, *dry rot,* will be used in this bulletin.

Dry rot can be prevented by taking proper precautionary measures. It can also be checked after it has gained entrance to a building though this is often at a considerable expense. It is the object of this bulletin to describe the trouble and its cause and to outline the methods of prevention and control.

The Cause of Dry Rot

Dry rot deterioration of lumber is caused by a fungus known technically as *Poria Incrassata.* This fungus is rather widespread and common in the Southern States and is likely at any time to cause trouble when the surrounding conditions are favorable for its development. The fungus is easily recognized by the abundance of white mycelium or mold which is present between the walls or in any protected place in an affected building.

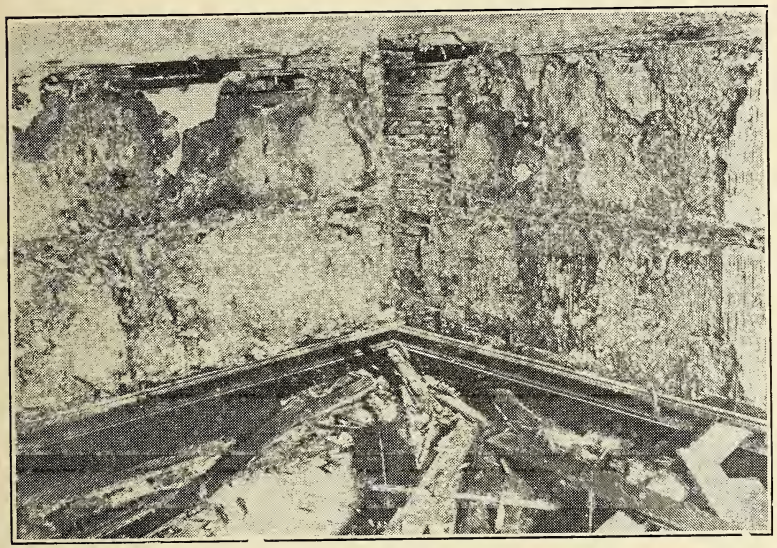

Fig. 1.—Corner of a room showing the mycelium of the dry rot fungus between the wainscoting and plaster within a partition wall. The fungus also shows on the wainscoting boards lying on the floor.

To understand dry rot, it is necessary to understand the method or manner of growth of this fungus. The fungus develops and spreads by means of white mats of mycelium which spread out in a fan-shaped manner. This mycelium develops very rapidly in places that are enclosed and are not subject to drying. In a building, such places are between the floor layers, between the partition walls and around enclosed foundation timber. These dense mats of mycelium fill every crack and crevice between the boards

in such areas. In figure 1 is shown a partition wall with the wainscoting removed. The fan-shaped mats of mycelium show on the plaster and also on the backs of the wainscoting boards that are lying on the floor.

As the fungus advances, it obtains its food material from the wood upon which it is growing. This action on the wood constitutes the decay. The wood turns brown in color and becomes very brittle. In the final stages of the rot, the wood can be crumbled between the fingers. Usually the wood decays very rapidly.

In order to act on and decay dry lumber, the fungus requires a very large amount of water. This it obtains from its connection with the ground or some other wet substance. Near the ground, the fungus usually develops thick strands of fungus tissue called rhizomorphs. These rhizomorphs spread out over the wet ground and form the connecting link between the water supply in the ground and the rapidly advancing mycelium. No matter how far the mycelium spreads out or how high in a building it travels, it must maintain a connection with a water supply. These rhizomorphs are usually about the size of a pencil or smaller but may become nearly an inch in diameter. Some of these rhizomorphs are shown in figures 3 and 4. When the fungus is growing and advancing rapidly, these rhizomorphs are usually so wet that water can be squeezed from them. This ground connection becomes of great importance in the control of dry rot.

An Example of Dry Rot

Dry rot can possibly best be appreciated by describing in detail an actual example. An excellent opportunity was had to observe this trouble in the wood portion of one of the brick buildings of the University, at Baton Rouge, during the summer of 1923. In the repair work that was necessary, all infected portions were traced out and removed and the actual conditions in all parts of the building were ascertained.

That something was wrong with this building was first perceptible in the spring of 1923. The trouble was

evidenced in two ways. *First,* it was noticed that objects left on shelves in one of the basement rooms became covered with a dense mat of mycelium and were cemented to the shelving and back wall. Some valuable electrical instruments were ruined by the mycelium running through them (Fig. 2). *Second,* it was noticed that the double floor between the basement and the first story was rapidly becoming weak and was breaking through in places. As the school term was in progress, only temporary repairs were made at the time. In August, after summer school was over, a more thorough inspection was made and the building was repaired so as to prevent a reoccurrence of the rot.

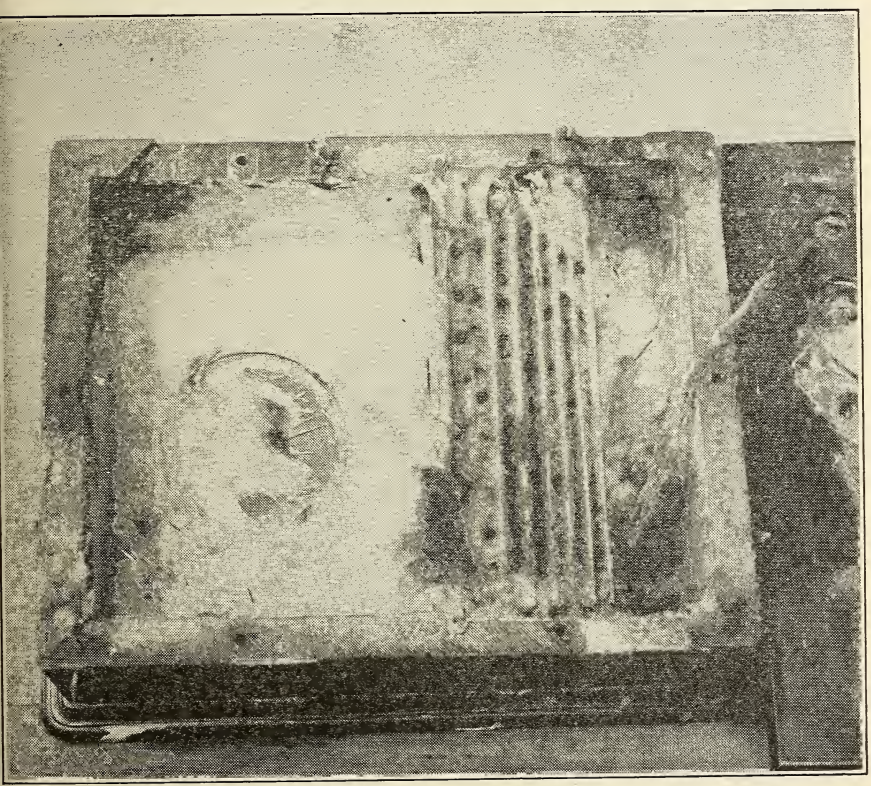

Fig. 2.—Electrical instrument (watt meter) with the top removed, filled with the mycelium of the dry rot fungus. The mycelium grew into the instrument from the infected shelf on which it was placed. About one-third natural size.

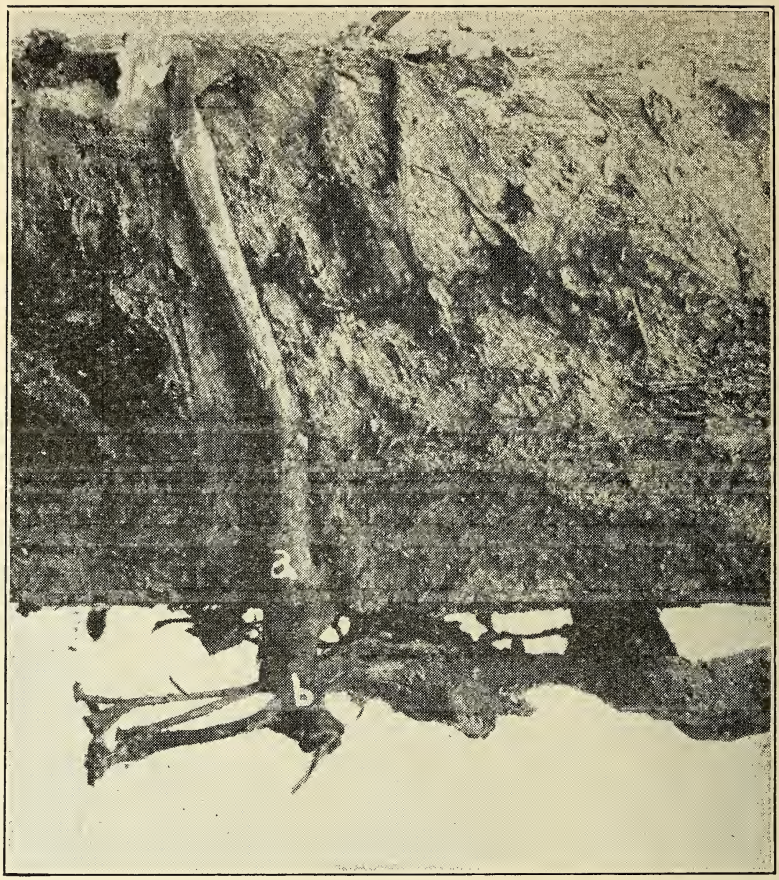

Fig. 3.—Rhizomorph of the dry rot fungus (a) at the point of attachment to the ground (b). One-half natural size.

The basement extended under only one end of the building and this was separated from the unused portion under the building by a double-board partition. This partition came within one to two inches of the ground. It was on the timbers of this partition that the fungus first became established and all the infected areas in the building had a direct connection with this area. The fungus had developed a number of large rhizomorphs which were firmly attached to the ground and extended over the surface of the partition

and into the floor above. The rhizomorphs shown in figures 3 and 4 were all taken from this building.

Where the fungus had reached the floor of the first story, it had spread out in all directions, growing between the floor layers and in the enclosed spaces in the partitions between the various rooms. Traveling up the wood partitions, in one place it had reached the floor of the second story. On the first floor, it had covered an area about

Fig. 4.—Large rhyzomorphs of the dry rot fungus. Slightly reduced.

twenty-five feet in diameter. In the center of this affected area, most of the wood was in very bad condition. Some of it could be crumbled readily between the fingers.

In all places where the fungus had sufficient water supply, it was growing very rapidly. At one place in the building, a new double floor had been laid at the time the temporary repairs were made in April. In August, when the permanent repairs were made, the fungus had grown for a distance of three to four feet between the new floor boards. At this rate, it would not have taken many months for the whole building to have become affected. In other places where the repairs had broken the connection of the fungus with the ground, the mycelium had practically ceased growing and had become dry.

The lumber which had been used in the construction of this building was largely cypress and heart pine. Both kinds were affected. The cypress apparently showed no more resistance to this type of decay than did the pine. It is known that practically all of the common woods are readily affected by this rot.

Another point of interest noted in regard to this building was that the ground under the portion that had not been finished into a basement was entirely infested with the dry-rot fungus. Pieces of new lumber dropped on this ground in April were covered with the mycelium between the ground and the wood, in August. In figure 5 is shown a piece of board that was left during this period and shows the heavy growth of mycelium. This point is of interest from the control standpoint.

In repairing this building, the wooden partition that was close to the ground was entirely removed and was replaced by a solid brick wall. Then all of the infected wood in the building was taken out and burned and was replaced by lumber that had been painted with creosote. Creosote was also used liberally on every piece of lumber that was exposed. Finally the ground under the building was treated with creosote in order to kill as much of the mycelium in the soil as was possible. No reoccurrence of the trouble is expected.

Lumber Yard Infections

Piles of lumber in lumber yards and at saw mills are also frequently infected with the dry rot fungus. This is especially true in yards where no special care is taken to prevent it, where the lumber is piled on the ground or on wooden cross pieces that are in contact with the ground. Lumber from such yards when shipped out over the country carries the infection with it. If any of this lumber is placed in the basement of a building where the moisture is sufficient, the fungus will start to grow and soon the whole building will be affected. It is in this way that many of the infections in buildings are started. This trouble is so serious that an inspection of lumber yards by some state department might be advisable.

Controlling Dry Rot

The control of dry rot is to be considered from two angles, the prevention of the trouble and the control after it has once gained an entrance to a building.

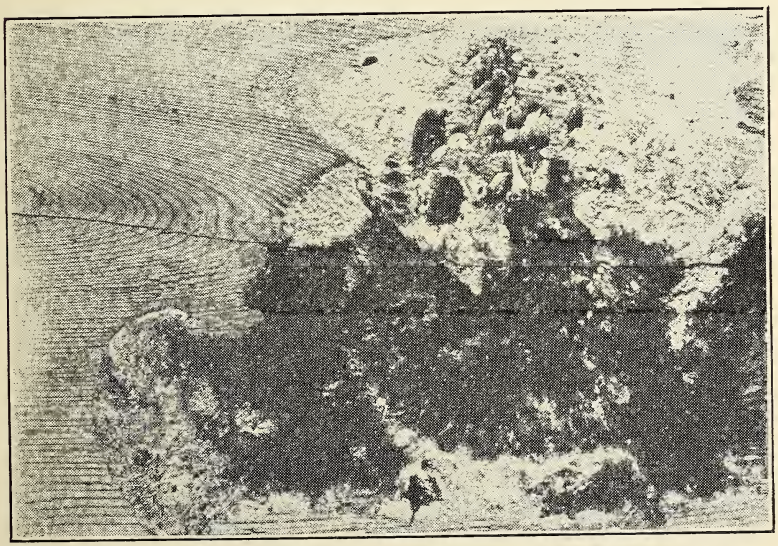

Fig. 5.—Mycelium of the dry rot fungus which had developed in four months on a twelve inch board which had been dropped under an infected building .

Prevention

Dry rot can usually be prevented if the proper precautionary measures are taken at the time the building is being erected. This is much more satisfactory and much cheaper than trying to stop an infection that is already started in a building. The precautionary methods that are important include the following:

1. All lumber that goes into a building should be inspected carefully. If any of it shows the characteristic white mycelium, it should not be used. As a matter of fact, it would be wiser to refuse the whole shipment of lumber and obtain it from some yard in which the lumber is stacked so that the dry rot will not affect it. If more of such lumber were refused, the lumber yards would be more careful.

2. Foundation timbers or any lumber that is to be placed within twelve or eighteen inches of the ground should be creosoted. There are creosoting plants in the South from which such timbers can be obtained. Creosoted lumber will not be attacked by the dry rot. A few dollars added to the original cost may result in a considerable saving in the end.

3. If buildings are to be placed close to the ground, it is better to use concrete or brick as high as possible instead of wood. During recent years there has been a tendency to place houses, especially of the bungalow type, close to the ground. Usually the outside wall is extended to the ground. The closeness of the timbers to the ground, combined with the poor ventilation, permits the dry rot to develop rapidly if it happens to be present. A house of this type has been seen by the writer in which the floor broke through in less than two years after being built.

4. Plenty of ventilation around the foundation timbers is essential as this keeps them dry and less likely to become affected by the dry rot.

5. Lumber or other wood material should never be piled under a house. Such material makes a very convenient path for the dry rot fungus to travel from the ground to the foundation timbers.

Dry Rot Control

After the dry rot has become established in a building, the control measures rest upon the eradication of the fungus with repairs that will prevent further growth and development. Usually by the time the trouble is noticed, certain parts of the building are in such a condition that repairs are necessary. Usually the trouble is first noticed by the floor or some of the timbers near the ground breaking through or giving away. In repairing an affected building the following measures are essential:

1. All infected lumber should be removed from the building and immediately burned. If the boards are not burned, they are likely to be carried away to other buildings and there start new infections. The infected timbers in a building are very easy to locate by the abundance of the white mycelium on the under or back surfaces.

2. In the repairs, regular creosoted lumber, or at least lumber painted with creosote, should be used.

3. In making the repairs, all wood material should be raised a foot or more from the ground. If this is impossible, concrete or brick should be substituted for the wood. Then if there is sufficient ventilation under the building, this will prevent the fungus from forming a connection with the ground and consequently hinders or stops its development. If this is not done and reinfection occurs, it will be only a short time until the new lumber used in the repair work will also be destroyed. This is possibly the most important point to be considered in the repair work.

Literature on Dry Rot

Much work has been done on the dry rot trouble by the Forest Products Laboratory of the United States Department of Agriculture. Anyone desiring further information on the trouble can obtain it from any of the following publications published by that office. These publications have been used freely in the writing of this bulletin.

HUMPHREY, C. J.—*Timber storage conditions in the Eastern and Southern states with reference to decay problems.* U. S. Dept. of Agr. Bul. 510. 1917.

HUMPHREY C. J.—*The destruction by the fungus "Poria Incrassata" of coniferous timber in storage and when used in the construction of building.* The Southern Lumberman, Vol. 49, No. 3, pp. 36, 37, 49-55. Feb. 1, 1923.

HUMPHREY, C. J.—*Destruction of lumber by decay.* Railway Purchases and Stores, March and April issues. 1923.

HUMPHREY, C. J.—*Decay of lumber and building timber due to Poria Incrassata.* Mycologia 15:258-277. 1923.